

Application No. 10/659,494
Response to Office Action

Customer No. 01933

Amendments to the Specification:

Please amend the title as follows:

INK JET HEAD AND INK JET PRINTER CAPABLE OF PREVENTING
VARIATION OF A VOLUME OF AN INK DROPLET DUE TO CROSS TALK

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Please amend the paragraph at page 10, line 22 to page 11, line 22 as follows:

When a negative driving signal with respect to the terminals G is applied from the driver IC to the electrode 12e, for example, in the ink jet head 1 having the above-mentioned construction, an electric field perpendicular to the polarizing direction occurs at the side walls 8d and 8e. The side walls 8d and 8e respectively bend in the opposite direction for increasing the capacity in the pressure chamber 7e as shown in Fig. 3 Figs. 3A and 3B due to an inverse piezoelectric effect caused by the electric field perpendicular to the polarizing direction, thereby producing a shear strain. This increases the capacity in the pressure chamber 7e (Fig. 3(a) 3A). Further, when a positive driving signal with respect to the terminals G is applied to the electrode 12e from the driver IC, the capacity in the pressure chamber 7e is decreased on the contrary (Fig. 3(b) 3B). As described above, applying the driving signal to the electrode 12e enables to selectively vary the capacity in the pressure chamber 7e to be

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selectively varied. When the capacity in the pressure chamber 7e increases, the pressure of the ink in the pressure chamber 7e is reduced, thereby ~~causes~~ causing a pressure fluctuation starting with a negative polarity in the ink in the pressure chamber. Further, when the capacity in the pressure chamber 7e decreases, the pressure of the ink in the pressure chamber 7e is increased, thereby ~~causes~~ causing a pressure fluctuation starting with a positive polarity in the ink in the pressure chamber 7e. The ink in the pressure chamber 7e is ejected from the ejecting nozzle 15e as ink droplets when the pressure fluctuation is overlapped fluctuations overlap with each other to thereby increase the pressure of the ink in the pressure chamber 7e.

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Please amend the paragraph at page 11, line 23 to page 12,
line 4 as follows:

Subsequently, the dummy nozzle 16 and the ejecting nozzle 15 are explained. ~~Fig. 4 is a~~ Figs. 4A and 4B are sectional view views showing shapes of the dummy nozzle 16 and the ejecting nozzle 15. The dummy nozzle 16 has a shape wherein the diameter of the nozzle is widened toward the ink ejecting direction. The ejecting nozzle 15 has, contrary to the dummy nozzle 16, a shape wherein the diameter of the nozzle is narrowed toward the ink ejecting direction.

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Please amend the paragraph at page 14, lines 9-20 as follows:

The above-mentioned dummy nozzle 16 and the ejecting nozzle 15 are easily formed by a processing process using laser beam L. Specifically, a laser irradiating device having an imaging optical system is utilized, wherein a relative position of a laser projection lens and the nozzle plate 14 is varied depending upon by an xyz stage, and in case where when the dummy nozzle 16 is formed, a laser converging surface is matched to the bottom surface of the nozzle plate 14 by the adjustment of the z stage as shown in Fig. 5(a) 5A, while the laser converging surface is matched to the top surface of the nozzle plate 14 by the adjustment of the z stage as shown in Fig. 5(b) in case where 5B when the ejecting nozzle 15 is formed.

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Please amend the paragraph at page 14, lines 21-23 as follows:

The acoustic characteristics of the dummy nozzle 16 and the ejecting nozzle 15 are as follows. When the following definitions are made in the ejecting nozzle 15 in Fig. 6 6B:

Please amend the paragraph at page 15, lines 16-19 as follows:

Considering here an inertial resistance M' and a viscosity resistance R' of the dummy nozzle 16 that is opposite in direction to the ejecting nozzle 15 as shown in Fig. 6 6A, a following formula (4) is obtained.

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Please amend the paragraph at page 21, lines 3-13 as follows:

Although the above-mentioned embodiment makes an explanation taking as an example the ejecting nozzle 15 and the dummy nozzle 16 both having the linear taper shape in the inner peripheral surface, the inner peripheral surface of an ejecting nozzle 15A and a dummy nozzle 16A may be formed like a curved taper shape as shown in Fig. 9 Figs. 9A and 9B. In this case, the ejecting nozzle 15A and the dummy nozzle 16A are formed such that the taper shape becomes symmetrical with respect to the ink ejecting direction, thereby being capable of making the flow impedances of the ejecting nozzle 15A and the dummy nozzle 16A approximately equal as described above.